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ALFALFA *on* CORN-BELT FARMS



FARMERS' BULLETIN 1021
UNITED STATES DEPARTMENT OF AGRICULTURE

ALFAFALFA, on Corn-Belt farms, if introduced in any considerable acreage, requires a great amount of labor at the most critical stage of the cultivation of corn.

This bulletin tells how the more successful Corn-Belt growers fit alfalfa into their cropping systems without interfering seriously with labor schedules.

This is done in the main by speeding up the haying operations and corn cultivation by the use of labor-saving implements and more efficient methods.

To some extent, the use of alfalfa for pasture serves to reduce the labor difficulties.

The methods of handling the alfalfa crop that have been worked out by some of the more experienced Corn-Belt growers are illustrated by several concrete examples of good management.

The material for this bulletin was obtained on 235 Corn-Belt farms on which alfalfa is grown successfully. (See fig. 1.)

Office of the Secretary
Contribution from the Office of Farm Management
E. H. THOMPSON, Acting Chief
Washington, D. C. July, 1919

ALFALFA ON CORN-BELT FARMS.

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STATEMENT OF CONDITIONS.



IS GRADUALLY assuming importance in the Corn Belt. In some localities where conditions are naturally favorable it is grown extensively, while in others less favorable its success has been limited. Progress in the introduction of alfalfa in general in this region has been affected very largely by three important factors:

1. Corn-Belt soils, as a rule, require inoculating and liming, and often expensive methods of preparation and seeding are practiced to insure success with alfalfa in the first attempts to grow the crop. When the soil is once inoculated, the crop is seeded more easily. On the average, also, alfalfa freezes out about once in every 5 years.

2. Clover, a long established crop, can be grown successfully with little trouble throughout the greater part of the region. This crop, unlike alfalfa, fits readily into the short rotations already established in the Corn Belt.

3. Alfalfa conflicts seriously with the corn crop, the first cutting of alfalfa coming in the height of the corn-cultivating season. As the acreage of alfalfa is increased, the labor problem of the average

Corn-Belt farm becomes more difficult, unless special means are adopted for relieving this situation.

THE MORE FAVORABLE VIEWPOINT.

Methods of growing alfalfa on Corn-Belt soils have been worked out throughout the region so that, as a rule, it is possible to grow the crop with profit, even though at considerable initial expense. After growing alfalfa successfully it is generally an easy matter to get a new stand, with about as much ease as red clover and often with the same inexpensive methods.¹

Alfalfa should not be considered as competing with clover for a place in Corn-Belt agriculture. Each crop has its own place, and while red clover is distinctly the short rotation legume of the region, alfalfa insures an additional hay supply, and in many instances,

permits of plowing under a large part of the clover in the rotation. In this way, alfalfa becomes an important factor in increasing the humus of the soil and in maintaining crop yields of the entire farm. Corn-Belt farmers in increasing numbers

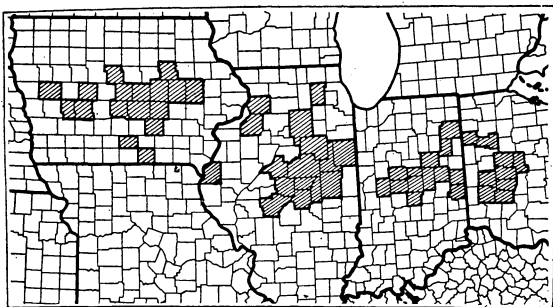


FIG. 1.—Shaded areas indicate parts of the Corn Belt visited in making the investigation on which this bulletin is based.

are growing alfalfa successfully, and are finding that it fills a valuable place as a means of soil improvement, and as a hay and pasture crop. Alfalfa produces heavier yields of hay per acre, and gives an all-summer pasture, which clover does not.

The labor conflict caused by the introduction of alfalfa is recognized as a serious problem, but is being overcome mainly by skilled management, by using better implements for corn cultivation, by using labor-saving equipment which speeds up the handling of hay, and by limiting and adjusting the corn and alfalfa acreages so that the regular labor of the farm can manage both crops.

¹ For the details of how to grow alfalfa the reader is referred to the following bulletins which apply generally and with special reference to local conditions in the States included in the area:

Ohio, Circular 113, Bulletin 181; Indiana, Circular 36 (revised edition); Illinois, Bulletin 76; Iowa, Circular 3, Bulletin 137; Michigan, Circular 1, Bulletins 271 and 225; Wisconsin, Circular 35, Bulletin 259. For the foregoing apply to the experiment stations in the States mentioned. The United States Department of Agriculture issues Farmers' Bulletins dealing with alfalfa.

CROPPING SYSTEMS INCLUDING ALFALFA.

As yet, alfalfa is not commonly grown on Corn-Belt farms as a part of the regular rotation, but rather on separate acreages especially prepared and set apart for it. As a rule, this crop is not relied upon for the entire hay supply of the farm. The usual practice is to devote a certain acreage to alfalfa, and continue the customary rotation over the remainder of the farm.

The stand of alfalfa usually fails in about five years, often sooner, and the usual practice is to break up the field and grow one or two crops of corn to get rid of blue grass. During this time the farm generally is without alfalfa, but the year following, with some additional applications of fertilizer and manure, the same acreage is re-seeded and a stand is generally secured quite easily. The crop is then allowed to remain until such time as the stand begins to fail again. Where alfalfa naturally grows well, the crop may be rotated readily from field to field in a regular order. Even under less favorable conditions, if the fields of the farm have become thoroughly inoculated and the other requirements for growing the crop have been met, the re-seeding of alfalfa may be done usually with comparative ease, so that the seed is often sown in the small-grain crops, such as wheat, oats, rye, and especially in barley, and without losing the use of the land for a whole season.

SYSTEMS ON GRAIN FARMS.

Strictly grain farms usually have cropping systems peculiar to that type, consisting mainly of short rotations with a certain separate acreage for alfalfa. Throughout Illinois and Iowa most grain farms have rotations of from two to three years' duration. The most typical two-year cropping system is as follows:

First year, corn.

Second year, oats or wheat, with a seeding of clover to be plowed under

Four to six years on a separate acreage, alfalfa.

In this system clover is merely incidental and, regardless of the character of the stand, is plowed under in preparation for corn. Alfalfa is used to furnish practically all the hay needed, which releases the catch crop of clover for plowing under. Thus alfalfa serves a very useful purpose, and makes possible a cropping system of considerable merit for keeping up crop yields on the entire farm. The following is the most common three-year cropping system:

First year, corn.

Second year, wheat or oats, with seeding of clover.

Third year, clover.

Four to six years on a separate acreage, alfalfa.

The rotation in this system is apt to be somewhat irregular. Failure to get a stand or winterkilling of the clover is apt to disarrange the rotation. Soy beans might well be sown where the clover has failed and thus maintain the rotation, but usually the field is plowed up and put in corn or oats. Thus there is a constant tendency to shift to the two-year plan. The two-year plan is much more simple, and increases the grain acreage of the farm by approximately one-third more than the three-year rotation. With the three-year system the alfalfa releases the clover in the rotation for pasture or the clover may be plowed under to enrich the soil.

SYSTEMS ON GENERAL AND LIVE-STOCK FARMS.

Throughout the Corn Belt are a large number of general farms which keep considerable live stock, yet sell more or less grain and hay. Such farms, as a rule, follow four- to five-year rotations, which, however, are too short to include alfalfa, and necessitate growing this crop on a separate acreage. On a few farms in localities well suited to alfalfa the crop is run in a regular five-year rotation, allowing the alfalfa to stand only from two to three years before plowing it up. Such a plan is not advisable where growing alfalfa is a more difficult matter.

The more common four-year cropping systems with alfalfa are as follows:

- (1) First year, corn.
Second year, oats.
Third year, wheat, with seeding of clover.
Fourth year, clover.
Four to six years on a separate acreage, alfalfa.
- (2) First year, corn.
Second year, corn.
Third year, oats or wheat, with seeding of clover.
Fourth year, clover.
Four to six years on a separate acreage, alfalfa.

The first four-year rotation is found mainly on general farms which tend slightly toward a grain rather than a live-stock basis. In either rotation timothy may be seeded with clover, and the rotation lengthened to five years by allowing the clover and timothy to remain two years. This plan yields more hay and pasture, and makes it possible to increase the live stock of the farm. The addition of alfalfa in these cropping systems makes it possible to increase still further the live stock, and to sell relatively more hay or release a part of the clover in the rotation to be plowed under.

The second four-year cropping system with its larger acreage of corn is found usually on general farms which are devoted largely to live-stock production. The addition of alfalfa makes a well-balanced cropping system for a live-stock farm, and is especially adapted to

hog farms. The alfalfa is valuable for the hay it adds, so that the clover in the rotation may be released for hay or pasture, and in addition, it furnishes an all-summer emergency pasture, which can often be used to good advantage. The usual tendency when alfalfa is added to the cropping system on general farms is to increase the live stock; 87 of the 235 farms visited had increased the amount of live stock materially, the increase ranging from 12 to 25 per cent.

SYSTEMS ON SPECIAL HAY AND LIVE-STOCK FARMS.

In southwestern Ohio and western Iowa, as well as in other restricted areas throughout the Corn Belt, alfalfa can be seeded readily with the small grain crop of the rotation. Usually where alfalfa is run as a part of the regular rotation, it is necessary to follow one of at least five years' duration, and in a few instances it was found in a system of this kind as follows:

- First year, corn.
- Second year, oats or barley, with a seeding of alfalfa.
- Third year, alfalfa.
- Fourth year, alfalfa.
- Fifth year, alfalfa.

Except in localities which are very favorable for the growing of alfalfa, the five-year rotation is too short to permit the alfalfa to remain long enough for the farm to get the full benefit of the stand before plowing it up; but where conditions are especially favorable, there is very little expense in reseeding alfalfa, and a five-year rotation may well be practiced. It is evident that such a rotation is highly satisfactory from the standpoint of building up the soil of the entire farm. It likewise affords considerable hay and pasture because three of the five fields are devoted to the alfalfa crop. Usually, however, there is a tendency to run alfalfa in longer rotations of from six to seven or even eight years' duration. The Wing farm of Champaign County, Ohio, is one of the best examples of a farm of this type. Similar farms are found here and there throughout the Corn Belt. The rotations on farms of this general type are usually as follows:

- First year, corn.
- Second year, corn.
- Third year, barley, with seeding of alfalfa.
- Fourth year, alfalfa.
- Fifth year, alfalfa.
- Sixth year, alfalfa.
- Seventh year, alfalfa.

This arrangement makes alfalfa the dominating crop of the farm. Four of the fields out of the total seven are producing alfalfa hay each year, one field is devoted to getting a stand of alfalfa with a nurse crop of barley, and two fields are devoted to corn. This type

of farm is extreme in its make-up and is suited only to localities in the Corn Belt which are especially well adapted to the production of alfalfa. It is also important that a large number of live stock be kept to consume the hay or at least the hay that is not salable on the market. Usually on such farms the operator specializes in winter feeding of lambs or beef cattle, lamb feeding being the enterprise which generally prevails. Where it is undesirable to carry on feeding operations on a large scale with this system of farming, enough live stock may be kept to consume the waste or second-class hay, and the first grade hay may be sold on the market.

Where alfalfa is made the most important crop of the farm system the chief difficulty is in meeting the labor requirements. A relatively large force of men is needed when the alfalfa hay is to be handled. It is difficult to keep these men profitably employed at other times, especially during the winter. If not employed the year round, it is generally necessary to depend on transient labor or the hiring of extra hands, neither of which can be relied upon generally throughout the Corn Belt sections. In some instances it was thought advisable under the circumstances to plan extra work for winter, even though unprofitable, in order to keep a sufficient crew to handle the alfalfa hay. Besides the labor difficulties, such a farm as a general proposition for the average farmer, as a rule, is undesirable.

THE LABOR CONFLICT BETWEEN ALFALFA AND CORN.

The first cutting of alfalfa, throughout the central Corn Belt, comes, as a rule, during the first nine days of June, the extreme dates ranging from May 25 to June 20. (See fig. 2.) This wide variation is due principally to difference in seasons. It will be noted further by reference to figure 2 that the first cutting of alfalfa comes in the midst of the cultivation of corn. Sometimes, by carefully planning the time of planting corn, the alfalfa may be cut just before or immediately after the first cultivation. Alfalfa must be cut within a period of about 10 days, however, in order to avoid injury to the second crop. and as this period shifts somewhat from year to year, it is difficult to reckon a definite time for the first cutting. As a result it generally happens that this cutting conflicts directly with the first or second cultivation of corn.

Not infrequently also the weather is very unfavorable for curing hay when the first crop must be handled, in which case haying is delayed and the labor is increased. Wet weather at such times retards the cultivation of corn. Under such conditions when a large acreage of alfalfa must be handled and there is also a large acreage of corn to be cultivated the work becomes especially difficult to handle.

The second cutting may vary from July 1 to July 31, but it usually comes between July 10 and July 19 (see fig. 2), conflicting with oats

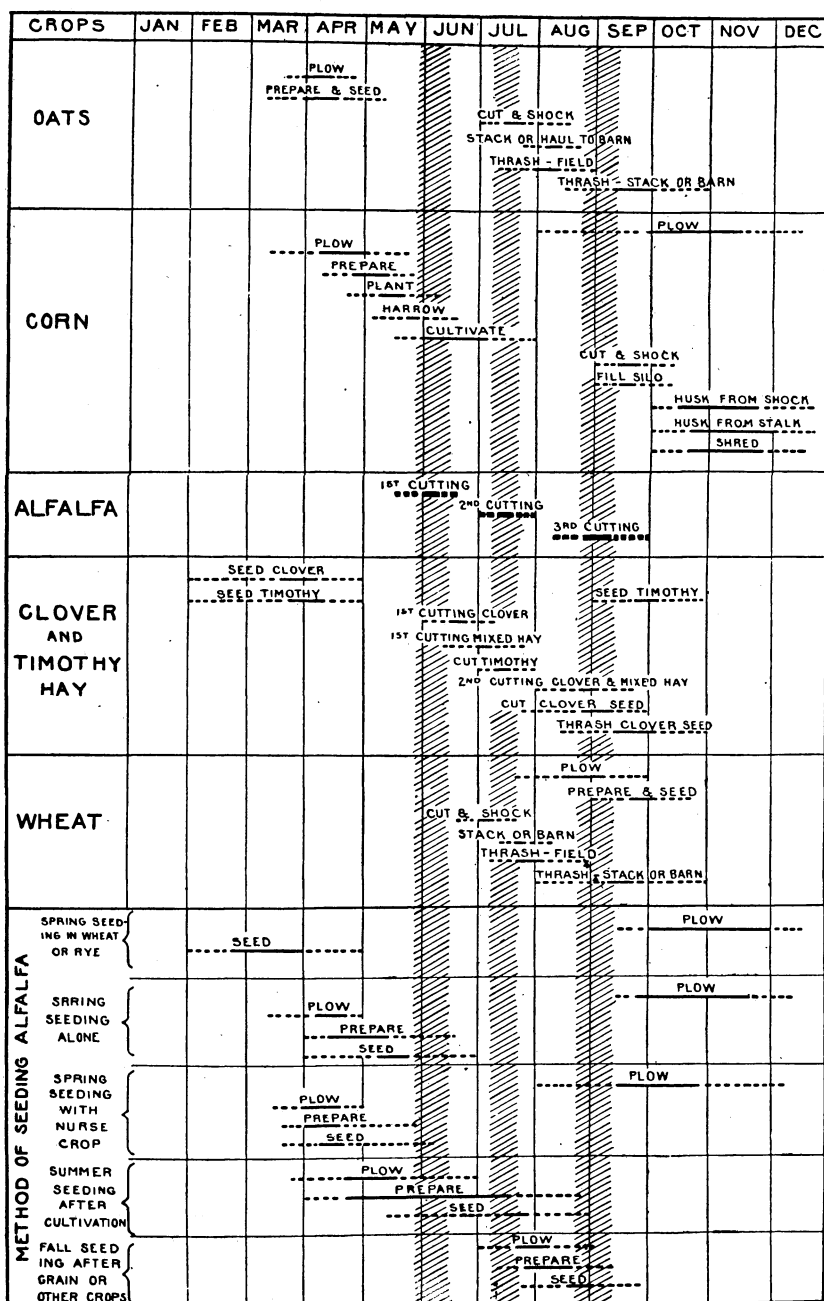


FIG. 2.—Seasonal distribution of labor on the principal farm crops of the central Corn-Belt region. The continuous lines show the average time in which each operation is usually done; the dotted lines show the extreme limits within which these operations may occur. By following shaded perpendicular bands one may note points of conflict between alfalfa and other crops. Data from 237 farms.

harvest, thrashing wheat, or cutting timothy hay, each of which is a comparatively short job. The yield for the second cutting is usually considerably lighter than for the first, and the weather is usually more favorable.

The third cutting, generally coming late in August or early in September, is still lighter than the second, and is handled with even less labor conflict. Thus it will be seen that labor difficulties in connection with the second and third cuttings of alfalfa are of little consequence and that the labor requirements of the first cutting are the vital factor in determining the acreage of alfalfa to be grown on a given farm.



FIG. 3.—While putting up the first cutting of alfalfa the corn cultivator often must stand idle in the field.

HANDLING THE HAY AND CULTIVATING THE CORN.

The amount of hay the available crew can handle and still take care of the corn cultivation is usually much more important in determining the acreage of alfalfa than the amount of hay actually needed on the farm or the income to be derived from it. The fact that throughout the Corn Belt the first cutting comes at the height of corn cultivation makes it necessary either to limit the acreage of alfalfa, since otherwise the farmer would have to reduce the acreage of corn in proportion as alfalfa is increased, or to provide sufficient labor to handle both operations without serious interruptions. As corn is the staple crop of the region, it is only natural that most growers choose to limit the acreage of alfalfa rather than that of corn.

As a rule, alfalfa is grown on the farms of the Corn Belt in areas from 5 to 15 acres in extent. Within these limits and even up to 25 acres farm operators are able to meet the difficulties in managing the crop in connection with the crop systems already established without hiring much outside labor, but when alfalfa is increased to 35 and 40 acres considerable extra help is needed. In proportion as the crop is pastured the usual small acreage of alfalfa may be enlarged without making it necessary to increase the farm crew.

WAYS OF OVERCOMING LABOR CONFLICT BETWEEN ALFALFA AND CORN.

The labor conflict between corn cultivation and the first cutting of alfalfa may be lessened in several ways. On well-managed farms an effort is constantly being made to keep the work well up with or a little ahead of the season. Fall plowing is done in order to lessen

IN GENERAL, the labor conflict between the alfalfa and corn is recognized throughout the region as being serious, but considerable progress is being made in overcoming this difficulty by the adoption of better methods and more improved machinery and equipment.

the work in the spring, and under favorable conditions, the spring operations are begun early. After planting the corn crop the spike-tooth harrow is used two or three times to get the ground in good condition and keep down the weeds. This work can be done rapidly, and it postpones the date when it will be necessary to begin cultivation. In the meantime, there is usually an opportunity to handle the first cutting of alfalfa hay. Sometimes it is necessary to carry on both operations at the same time, cultivating corn in the forenoon, when little can be done in the hay field except the mowing. In this way very little time is lost.

THE TWO-ROW CULTIVATOR.

The use of the two-row cultivator is one of the most effective means of relieving the pressure caused by this labor conflict. This implement has been slow in gaining recognition, but where used with ordinary skill and reasonable care, its value is indisputable. With it one man and three horses can do practically as much as two men and four horses with one-row cultivators. Farm records taken on 237 Corn-Belt farms in Ohio, Indiana, Illinois, and Iowa show an average of $6\frac{1}{2}$ acres cultivated per day with the one-row cultivator, with individual records ranging from 5 to 8 acres per day. Thirty-three

records on the use of the two-row cultivator show an average of 13 acres per day, with individual records ranging from 10 to 15 acres per day. In general these implements, where they receive a fair trial, are giving entire satisfaction. (See fig. 4.)



FIG. 4.—A two-row cultivator makes it possible to rush the corn cultivation and get it out of the way, or it makes it easier to make up the time lost in handling the alfalfa crop.

If the need of cultivation is delayed by harrowing, and the corn is allowed to grow a few days before cultivation starts, the two-row cultivator can be used for the first cultivation as well as later. Generally both one- and two-row cultivators are used on the same farm, but on 10 of the farms visited the cultivation was done entirely and satisfactorily by two-row cultivators.

LABOR-SAVING METHODS OF HANDLING HAY.

The efficiency of the methods used in handling and curing the hay is of great importance in fitting alfalfa into the cropping system. A study of the haying operations on 235 Corn-Belt farms shows that four fairly distinct methods are in common use in handling alfalfa throughout this region. From the standpoint of actual time consumed and labor required, these methods vary greatly, as is shown by the following table, based on the first cutting and a yield of $1\frac{1}{2}$ tons per acre:

Time and labor required in handling and curing alfalfa hay by different methods.

[First cutting, yield $1\frac{1}{2}$ tons per acre.]

Method.	Number of farms.	Average acres of alfalfa per farm.	Hours of labor per acre.	
			Man.	Horse.
1. Cut, rake, cock, haul, and put in barn, hay pitched by hand.....	111	14.02	8.66	7.65
2. Cut, rake, haul from windrow, and put in barn, hay pitched by hand...	65	13.34	7.01	8.25
3. Cut, rake with side delivery, put in barn, hay loader used in loading....	54	12.66	5.70	7.54
4. Cut, rake, haul to stacks in fields with buck rake, hay stacked with stacker.	2	38.25	4.80	5.64
5. Cut, rake, haul to baler with buck rakes, then hauled to barn on wagon.	3	22.7	9.56	9.96

From method 1 to method 4 there is a gradual decrease in the labor required, the average amount of man labor required per acre by method 4 being only a little more than half that required by method 1, if results obtained on the two farms using the method 4 may be taken as normal. Method 5 includes baling in the field, and is not comparable with the others, but it is worthy of note that on the three farms following this method, the combined operations required only about one hour more of man labor per acre than method 1. (See fig. 5.)

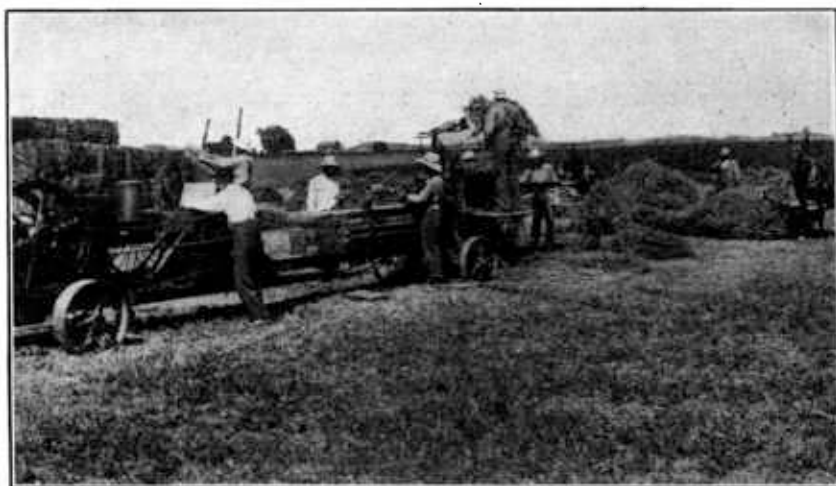


FIG. 5.—Baling from the cock requires a little more time than putting the hay in the barn loose, but if it is to be baled at all considerable time and labor are saved by baling in the field.

HANDLING BY HAND.

The first method is most common; it was practiced on 111 of the 235 farms visited. Because of the great amount of hand labor involved in cocking and in pitching the hay on to wagons by hand, method 1 requires the most time and labor. Many of the growers

visited did not have acreages large enough to justify the purchase of labor-saving equipment, while others with large acreages clung to the belief that cocking the hay and handling it by hand was a necessary step.

Hand handling without cocking.—Method 2 is practically the same as method 1, with cocking omitted. The difference between these two methods in labor required is practically the time necessary for cocking. The saving in time by methods 3 and 4, as compared with 1 and 2, is due largely to the better use of haying machinery and to the fact that cocking and pitching by hand are entirely eliminated.

Whenever the speeding-up process becomes desirable, pitching the hay on to the wagon by hand must first be abandoned. Two men pitching by hand will put on wagons ordinarily but 2 to 3 tons per



FIG. 6.—Pitching hay on to the wagon by hand, though slow and laborious, is still practiced on the larger number of farms.

hour, whereas by some of the other methods, from 3 to 4 tons of hay may be placed on wagons with much less man labor. (See fig. 6.)

By avoiding cocking, the process of haymaking is considerably shortened and much time is saved. Estimates taken on 111 alfalfa farms, with an average yield of $1\frac{1}{2}$ tons per acre, gave an average of about two-thirds of a ton as the amount one man will cock in an hour, and $4\frac{1}{2}$ acres as the amount one man will cock in a day of 10 hours. Where 20 to 25 acres of hay are to be put up, the cocking requires from four to six days of labor for one man or a full day's work for from four to six men.

Under the more common methods employed in the Corn Belt, especially methods 1 and 2, hay is generally allowed to cure in the swath one and one-half or two days after cutting, when it is usually raked and cocked. (See fig. 7.) Hay cured mainly in the cock is

usually of excellent quality and color, hence is in demand on the market, but in many cases, the better quality thus produced may not justify the extra labor required.

HANDLING WITH SIDE-DELIVERY RAKE AND HAY LOADER.

Method 3 is much more rapid and far less laborious than either method 1 or method 2. The hay is usually allowed to lie in the swath one day after cutting, when it is raked into windrows by the side-delivery rake. If weather conditions are good, the hay is allowed to remain in the windrows another day and then is taken up from the field by means of a hay loader. In case of rain the windrows are left unmolested until good weather comes again, when the hay, while still wet, is turned by the use of the side-delivery rake, and after



FIG. 7.—With alfalfa the tendency is to use methods which include cocking.

drying a few hours in this condition it is ready to be loaded on wagons and taken to the barn. This method saves time and much labor.

STACKING WITH BUCK RAKES AND STACKER.

The method of curing and handling the hay preparatory to the use of a buck rake or sweep rake varies greatly. As a rule, it is not satisfactory to take the alfalfa hay out of the swath with the buck rake, as is sometimes done with mixed hay or timothy. In most cases the alfalfa hay is cured in the field and raked into windrows with the ordinary dump rake. The hay may be bunched in the windrow by the dump rake, cocked by hand, or taken directly from the windrows by the buck rake without any further preparation. In some instances, the side-delivery rake is used for making the windrows,

which are sometimes made larger by throwing two together. The side-delivery rake makes a looser windrow than does the ordinary dump rake, and thus the hay can be raked sooner after cutting than with the dump rake and can be cured more thoroughly in the windrows, which improves the quality of the hay and to a great extent prevents the loss of leaves. In some instances the curing is done largely in the cock, prior to hauling.

LABOR-SAVING IMPLEMENTS.

LABOR-SAVING implements are a most effective means of speeding up hay-making operations. As haying methods in general are improved, and as special equipment is used to better advantage, labor difficulties arising from the introduction of alfalfa into the cropping system may gradually be overcome, and increasing acreages can be grown without serious interruptions to the regular operations of the farm.

THE BARN FORK AND HAY SLING.

The hay fork, either alone or in combination with the hay sling, is a great factor in speeding up haying operations. On many farms two double-harpoon forks are used instead of one, thus further reducing the time required for unloading. Usually on each fork is a pulley through which a rope passes with a double hitch, and as the pull is exerted, the forks, one at each end of the load, carry with them a layer of hay from the entire load. On some farms the forks are attached to the end of the hay rope by two chains or ropes, each from 3 to 5 feet in length. This arrangement serves the same purpose as the more complicated equipment just described.

In addition to using two double-harpoon forks, Mr. J. A. Cochran, of Allen County, Ohio, uses a hay sling for each wagon, which he spreads on the hay rack and on which the hay is loaded. After unloading has proceeded to a point where the remainder of the hay can be taken up at one pull, the sling is attached to the hay rope and the rest of the load is carried up at one operation. Thus no time is lost in cleaning up by hand, as is necessary when the entire load is removed by the hay forks alone. Used in this way in connection with hay forks, the sling makes it possible to unload hay very rapidly.

Mr. S. S. Kooser, of Storey County, Iowa, uses the hay sling alone very effectively in putting hay in the barn. His alfalfa field is only a quarter of a mile from the barn, and buck rakes are used for hauling the hay from the field. The hay is taken up from the end of the barn by the hay sling. The sling, in fact, is necessary in this case

because the buck rake leaves the hay too loose to be handled by the average hay fork. To accommodate the sling to this work, about 6 inches of earth is dug away, making a depression the size of the sling, in which it is spread. The buck rakes are driven up to the point where the hay is directly over the sling, then the teeth are let down and the rake is backed off, after which the sling is attached to the end of the hay rope and the entire load of the buck rake is taken up at one pull. The estimate given in the records taken on this farm is a little over 4 hours of man labor and $4\frac{1}{4}$ hours of horse labor required to put in the barn an acre of alfalfa, allowing $1\frac{1}{2}$ tons per acre. This estimate of the labor requirement is even lower than the average for method 4, the best method described on page 13.



FIG. 8.—The elevator, web, or drum loader damages properly cured alfalfa hay very little more than does the loading by hand, and places on wagons from 3 to 4 tons of hay per hour.

SIDE-DELIVERY RAKE AND HAY LOADER.

A rather general prejudice exists against the use of the hay loader among alfalfa growers in the Corn Belt. The common belief is that this implement thrashes off and loses too great a proportion of the alfalfa leaves. The loaders on the market, however, are of two different types. The objection, in a great measure, holds good for one type but is not so applicable to the other. Taking into consideration the rapidity with which the hay can be handled, a loader of the better type is highly desirable where alfalfa is grown in considerable acreages. (See fig. 8.)

The greater part of the alfalfa hay of the Corn Belt is put in barns, and comparatively little of it is stacked out. Hence the importance

of the side-delivery rake and hay loader, as this equipment offers about the most satisfactory means so far devised for putting hay into the barn rapidly under average conditions.

The web or elevator type loader.—The hay loader shown in figure 8 is known as the "elevator," "belt," "web," "cylinder," or "drum" type. This type in general takes up the hay by means of revolving cylinders or drums with flexible wire claws or spurs, and elevates it by means of carriers made of belts or chains and cross slats. Occasionally a web or canvas is used for this purpose. Some manufacturers are now making this type of loader with a solid bottom in order to save more of the shattered leaves of the hay. This type of implement makes it possible to handle the hay rapidly with very little damage from the loss of leaves. It is the general

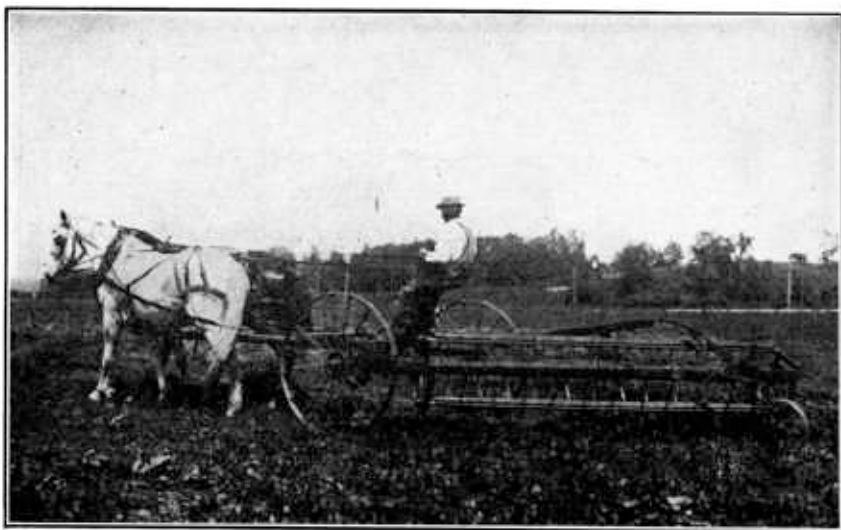


FIG. 9.—The rotary type of side-delivery rake leaves the hay in good condition for curing in the windrow.

testimony where these loaders are in use that the hay is not injured materially, but it is conceded that a little more work is required in loading with them than with some of the other types which push the hay farther up on the load.

That these loaders may be used to the best advantage, the hay must be cured properly and raked into medium-sized windrows. When only partially cured it should be raked with a side-delivery rake, which leaves the hay in a loose, twisted windrow through which the air can circulate easily. In order to leave the hay in the best condition for curing, the side-delivery rake should be of the rotary rather than the hay tedder type. Figure 9 shows a side-delivery rake of the type generally recommended for use with the web or elevator loader.

The rake-bar type loader.—The rake or rake-bar type of loader, while considered a good implement for putting up clover or mixed hay, is not so well suited to handling alfalfa. This loader is essentially a series of rake-like claws and flexible wire spurs on two sets of wooden bars, each set of bars moving alternately up and down along an inclined plane. The claws gather the hay from the ground, and the bars in their sliding action push it gradually up the inclined plane until it falls upon the load. This type of loader subjects the hay to a process of beating or flailing in this upward movement. In the case of well-cured alfalfa, this action thrashes off large quantities of leaves. It is generally recognized that it requires less labor to handle hay on the load when elevated by the rake type than when the web type is used. The rake type pushes the hay further forward on



FIG. 10.—The rake or rake-bar type of loader is not considered a good implement for loading alfalfa hay, on account of the loss of leaves.

the load, and thus saves considerable labor for the men who are loading. A web loader keeps two men very busy, whereas, with the rake type, one man, when the occasion demands, can do very well at loading alone. This feature is to be considered in choosing a loader for handling hay other than alfalfa. Figure 10 shows a loader of the rake type being used, perhaps inadvisedly, in taking up alfalfa from the swath.

On a number of the farms visited methods of handling alfalfa hay with these outfits have been well systematized. The plans vary slightly, but in general are similar. The method practiced on a farm in Champaign County, Ohio, is especially worthy of consideration. It has been worked out with great care by the owner of the farm, Mr. J. C. Greer, and is given herewith in detail.

AN EXAMPLE OF GOOD HAYING METHODS.

The hay is raked with the side-delivery rake in the forenoon of the next day after cutting and is left in the windrow usually 2 days, or until ready to be put into the barn. In case of rain, these windrows, while still wet, are turned with the side-delivery rake. The hay is taken up out of the windrow with an elevator or web loader and is taken up into the barn by the use of two double-harpoon forks fastened to the end of the hay rope by two chains each about 3 feet in length.

This farm at present has 24 acres of alfalfa. This acreage is cut with a 6-foot mower in $1\frac{1}{2}$ to 2 days of 10 hours each. It is raked with the side-delivery rake in three-fourths day or $7\frac{1}{2}$ hours, and if it is necessary to turn the hay on account of rain the turning is done also with the rake in the same length of time.

The yield of hay for the first cutting is on the average $1\frac{1}{4}$ tons per acre, or 30 tons on the 24 acres. This amount is taken up out of the field and put in the barn in a fraction less than 10 hours, or at the rate of 3 tons per hour. The field is close to the barn, not over one-fourth mile distant, and little time is lost in hauling.

A crew of seven men and eight horses with two wagons is used for hauling. The distribution of the crew is as follows:

Two men in the barn to mow away the hay; one man on each wagon to drive to and from the field, set the fork in unloading, and work on the load in the field; one man to drive the team on the fork at the barn; one man in the field who helps load each wagon in turn, and one man who drives the 4-horse team in loading. Two horses are used on the wagon to draw the hay from the field; two on the fork at the barn, and two in the field to change from one wagon to the other in making up a 4-horse team.

In order to get this crew together, it is necessary to get three men and two horses from a neighboring farm for one day while putting the hay in the barn.

In good weather haying, from start to finish, is over in 4 days. It keeps one man and his team out of the corn field and away from the job of cultivating for two days while mowing, and another man and his team from the cornfield a day and a half to rake, and in case of a rain a day and a half to turn the windrows.

The entire farm crew of three men and six horses must quit the cornfield for one day when the hay is put in the barn, and another full day to help the neighbor in return for the use of his crew of two men and two horses.

Thus a crop of comparatively large acreage for the Corn Belt is handled on this farm with little disturbance to the cultivation of corn, which would not be possible without the use of improved machinery.

Low-down wagons and hay loader.—The wagons used on this farm are suited to haying, being low, with broad wheels to prevent cutting up the field, and were made up at an outlay of about \$35 each, complete. The running gears were from old farm wagons on which the wheels had given out. The low iron wheels were purchased for \$17.50 per set. The racks were made on the farm at a total cost of about \$10 per rack. These racks are 16 feet long and 7 feet wide when opened for hay. On each side and end is a board 1 foot wide held by six hinges. When these are lifted upright and fastened to the end gates, a tight box 1 foot high, 5 feet wide, and 16 feet long is formed.

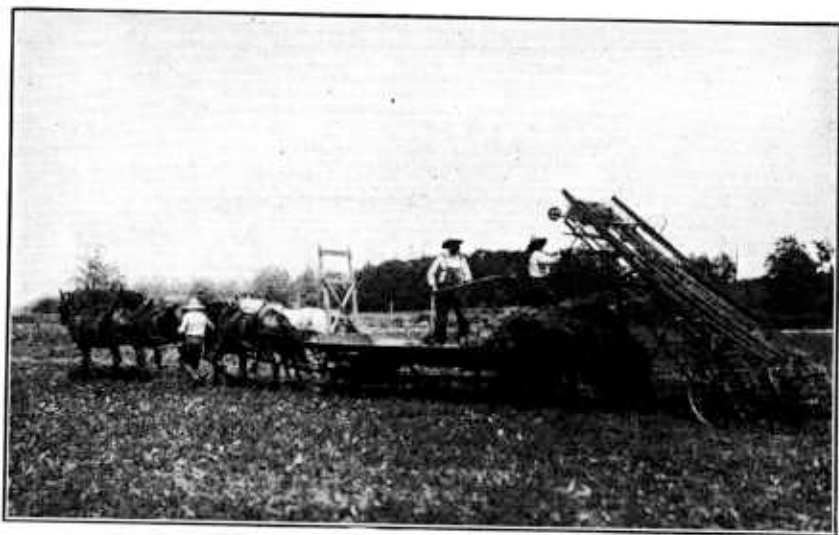


FIG. 11.—A low-down, broad-tired wagon and hay loader as used on a farm in Champaign County, Ohio.

The hay loader used on this farm, shown in figure 11, was purchased four years ago for \$65, but at this time (1919) it would cost considerably more. The side-delivery rake purchased at the same time cost \$50, but this also would be higher now.

The effective combination of the low-down wagons and loading equipment has been obtained with comparatively small outlay of money. This outfit has been a very important item in fitting a good acreage of alfalfa into the cropping system of a Corn-Belt farm. In fact, with this outfit it would be possible to increase materially the acreage grown on this farm without seriously affecting the labor schedule.

THE BUCK RAKE AND HAY STACKER.

The buck rake or sweep rake is found in the Corn Belt principally on farms which have large acreages of hay, but there is little doubt of its value in handling smaller acreages as well. This implement is of great value in speeding up the haying operations and in reducing the amount of hand labor necessary.

The buck rakes in use are of different sizes but are generally of the three- or four-wheel type. This type has an arrangement for elevating the teeth after the load is taken on, which keeps the hay from dragging on the ground. Generally these rakes are so made as to permit folding up when it is necessary to move them from field to field through narrow gates.¹



FIG. 12.—Type of stacker and buck rake in use on one of the alfalfa farms in Champaign County, Ohio.

In the Corn Belt the handling of alfalfa hay with buck rakes is usually confined to the large acreages, where it is necessary to stack most of the hay in the field, but not infrequently these rakes are used to good advantage in putting the hay in the barn or hay shed where the haul is not more than about one-fourth of a mile.

In using the buck rake in stacking hay in the field some form of hay stacker is essential. A number of devices of this kind are on the market, and several efficient types may be made on the farm.

Buck rake and stacker on one farm.—An exceptionally good example of the use of buck rake and stacker is found on the farm of H. C. Rogers, Champaign County, Ohio. When sufficiently cured, the hay is raked and immediately put in well-built cocks, the entire

¹ For more complete description of the different types of buck rakes in common use, see *Farmers' Bulletin* 838.

crew available being engaged in this operation until 10 or 15 acres have been cocked up. In case of rain the cocks are not opened until well dried off. When ready to stack, the cocks are upset so that they may dry out further. These upturned cocks are gathered in by buck rakes, from three to five at a time, and hauled to the stacker.

The stacker used is of the overshot type. (See fig. 12.) When in operation, it is loaded on the running gears of an ordinary wagon and hauled from place to place where the hay ricks are to be built. The stacker used by Mr. Rogers has been in operation for about five years and continues to give satisfaction. The outfit with two buck rakes cost, when new, \$120.

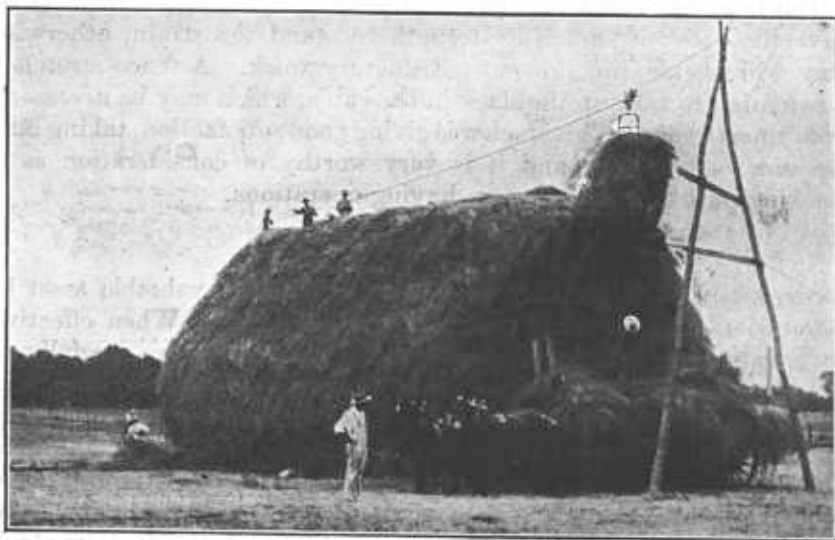


FIG. 13.—An inexpensive stacking device that may be used to advantage in putting up alfalfa hay where it is desirable to build large ricks.

Considering the small crew required and the amount of work that can be done in a given time, the adoption of some such outfit as this is well worth consideration where any considerable quantity of hay is to be stacked in the field.

The usual crew for operating such an outfit is two men to run the rakes, two men on the hay ricks, and one boy to drive the team on the stacker. Six horses in all are required—two on each of the buck rakes and two on the stacker. Five men and six horses with this outfit will gather in and stack from 2 to 3 tons of hay per hour, depending on the yield, the distance to be covered, and the skill attained in operating the equipment.

A homemade stacker.—A simple and inexpensive homemade stacking device which is coming into rather general use consists of four poles set up in pairs at each end of the rick, crossed and fastened

together at the top, with a cable running through the forks made by the crossing of the poles. The cable, stretched tight and fastened to the ground at each end some distance out from the poles, serves as a track for the fork or sling.

Figure 13 shows a stacker of the above-described type in operation near Huntsville, Ohio. The 160 feet of $\frac{5}{8}$ -inch cable and the cable car cost \$18 in May, 1917. The pulleys, forks, and 150 feet of rope were taken from the barn, thus eliminating special expense for these parts. The poles at each end of the rick are 31 feet high. The rick shown, which baled out 52 tons of hay, was put up by six men, one boy, and five horses in $2\frac{1}{2}$ days of 10 hours each.

The first point to be observed in putting up such a stacker is to have the poles of sufficient strength to stand the strain, otherwise they will buckle and prevent satisfactory work. A fence stretcher is essential, to take up the slack in the cable, which may be necessary from time to time. This stacker is giving good satisfaction, taking into account its low cost, and it is very worthy of consideration as a stacking outfit for speeding up haying operations.

STACK COVERS.

Stack covers, if properly used, may be made a valuable asset in connection with stacking outfits of various kinds. When effective covers are used, it is not necessary to top out the rick so carefully as would otherwise be required, thus saving considerable time and labor. The value of stack covers, however, depends very largely upon whether the cover can be handled readily, is effective, and does not interfere with the curing of the hay. Numerous attempts have been made to use stack covers made of canvas, while others have been built of wood. Probably one of the most satisfactory stack covers is made of metal roofing material—usually corrugated roofing, though other metal covers of various designs are on the market.

Figure 14 shows a metal stack cover on a commercial alfalfa hay farm near Mechanicsburg, Ohio. This type of metal stack cover is reported to be very satisfactory. On most farms where this cover was found, the regular practice is to stack the hay in the field and leave it there until it is convenient to bale it in preparation for the market. The claim is made that the hay is thus about as well protected as if it were in the barn. The material for the stack cover shown in figure 14 was purchased in 1912. The price at that time was \$64 for a cover 40 by 20 feet, but is much higher at present (1919). It is the usual practice on this farm to build ricks 16 feet wide, using three lengths of the covers instead of two as shown in figure 14

PASTURING ALFALFA.

The pasturing of alfalfa is not as yet a common practice throughout the Corn Belt. Owing to the comparative newness of the crop in the region, and the expense and difficulties which have been encountered in getting a stand in numerous localities, pasturing, as a rule, has been studiously avoided. Alfalfa as a pasture crop, however, is rapidly growing in favor among the more enterprising growers, especially where the crop can be grown without great difficulty.

In fact, throughout the region, as a whole, as the growers become familiar with the details of growing the crop, a tendency to use alfalfa as a pasture in a limited way becomes apparent. Especially after the stand has begun to fail, it is becoming common to pasture the crop for a year or two before plowing it up for corn.



FIG. 14.—Metal stack covers save time and labor and prevent loss of hay from exposure to weather.

In central Iowa and throughout a great part of the typical Corn Belt area of Illinois, the scarcity of suitable hog pasture from the middle of July to the latter part of September has led most growers to pasture their alfalfa, at least after the second cutting of hay, regardless of whatever danger there may be of injuring the stand. Throughout the greater part of the Corn Belt in Indiana the growers are, as a rule, more conservative, but in west-central Ohio the pasturing of alfalfa is increasing rapidly. In the Corn Belt region, as a whole, about 22 per cent of the alfalfa farms visited used alfalfa as pasture very successfully, while on the other 78 per cent no attempt had been made to use the crop for this purpose.

Alfalfa has certain decided advantages over most of the other pasture crops of the region. It shoots up a vigorous growth early

in the spring, and furnishes an abundance of forage until killed by frosts in the late fall. When a stand is once established a good pasture is generally assured for several years, thus eliminating considerable uncertainty.

Throughout July, August, and the greater part of September alfalfa meets a pressing need, when clover and bluegrass fall short and yield but little first-class forage.

Alfalfa has a greater carrying capacity than red clover at all times, and during the drier seasons of the year affords forage of much better quality.

METHODS COMMONLY FOLLOWED IN PASTURING ALFALFA.

The methods followed in pasturing alfalfa in the Corn Belt vary greatly according to adaptability of the crop to the locality, size of the farm, and acreage of alfalfa available for pasture. It is generally conceded that pasturing alfalfa shortens the life of the stand more or less, and in selecting a method of pasturing this fact is usually taken into consideration. It is usually considered injurious to turn in live stock very early in the spring, before the plants get a good start, or to pasture the crop closely during the latter part of the summer or late in the fall. In general, it is considered unwise to pasture alfalfa until after it is at least one year old.

As a rule, it is safe to assume that a good stand of alfalfa will last three or four years in the Corn Belt, even when used mainly for pasture, provided the method of pasturing is not extremely injurious. Several instances were found where alfalfa had been pastured judiciously for seven or eight years, and was still in fairly good condition. However, if the method of pasturing practiced is such that the crop is killed out one or two years sooner than it otherwise would be, it is generally considered to have served its purpose profitably.

CONTINUOUS PASTURING TO FULL CAPACITY OF THE CROP.

This is perhaps the least desirable method, certainly the one that kills out the stand most quickly. On old stands or in sections where conditions are very favorable for growing alfalfa, this method is doubtless permissible if a large amount of live stock is carried. As a method for the Corn Belt as a whole, however, this plan of pasturing is rather too destructive of the stand. If pastured continuously with reasonable care and at something less than the full carrying capacity, the stand may be maintained for several years in good condition, but close pasturing will soon reduce the carrying capacity materially.

Pasturing closely not only tends to kill out the stand, but encourages the growth of bluegrass. While the combination of bluegrass with alfalfa makes a good pasture, the alfalfa soon disappears alto-

gether, after bluegrass once begins to come in. After pasturing alfalfa heavily by this method for a year or two, it is generally necessary to plow up the stand and put the field in some cultivated crop to kill out the bluegrass before seeding again to alfalfa.

INTERMITTENT PASTURING.

Intermittent pasturing is made possible by fencing the alfalfa pasture into three or more separate lots or fields. The live stock is pastured first on one, then on another. If there is not enough live stock to keep the crop pastured down, it may be clipped or some hay may be cut, after which the crop is allowed to grow up again before turning in live stock. Figure 15 shows a small acreage of alfalfa fenced off for use under this system of pasturing.



FIG. 15.—The hogs are pastured on one field for a while, then changed to another.

This system assures good quality of forage, but the method in general is not carried out successfully on many farms in the Corn Belt, as it requires too much labor for building fences and changing the live stock from field to field. If the alfalfa is pastured closely, this method is rather destructive to the stand, but if pastured moderately, usually little damage is done.

PASTURING CONTINUOUSLY AND CUTTING FOR HAY.

This method is more profitable and more suitable to Corn-Belt conditions than the methods above described. Under this plan the acreage of alfalfa is much greater than is needed for pasture, hence it may be cut at regular intervals. Figure 16 shows hogs pasturing a large field from which practically a full cutting of hay is being harvested.

If alfalfa is pastured lightly and a fairly good crop of hay is cut, the danger of injuring the stand is slight, and there is little, if any, need of discontinuing the pasturing while the crop comes on after cutting. In the case illustrated in figure 16, about one-third of the field was cut a week or 10 days earlier than the rest, thus insuring against a shortage of pasture for the hogs, which might have occurred had all the hay been cut at one time. This method requires no extra fencing and no changing of live stock to other fields, and is especially desirable where there is a fairly good acreage of alfalfa on the farm.¹



FIG. 16.—If the acreage is more than is necessary to take care of the live stock, pasturing makes little impression on it.

PASTURING HORSES, CATTLE, AND SHEEP.

On several farms visited, horses are pastured on alfalfa with very satisfactory results. In numerous instances the farm work horses are pastured on alfalfa to a considerable extent when other pasturage is scarce. An instance of more extensive pasturing of the crop by horses was found on an Indiana farm on which the raising of pure-bred horses is an enterprise of considerable importance. Here, in addition to cutting some hay, it is the regular practice to pasture

¹ Pasturing the hay crop is a system of pasturing alfalfa in use in the irrigated regions of Arizona, and might be applicable in the Corn Belt to some extent under certain conditions favorable for growing the crop. This system is described in Circular 54, Office of the Secretary, United States Department of Agriculture, and in brief consists of pasturing alfalfa, principally with cattle, to the extent of harvesting the entire hay crop in a short time. The fields are allowed to grow up almost to the time for cutting and then enough cattle are turned in to harvest the crop in 10 days or 2 weeks. Then they are turned into another field to repeat the process. Some of the fields are pastured sufficiently in the spring to delay the hay crop enough to cause different fields to be ready to cut for hay at different times, thus furnishing continuous pasturage.

This method was found in one instance in Indiana where cattle were turned in to harvest the last cutting of hay, and in a few instances enough sheep were turned in to accomplish practically the same results.

horses continuously on some of the older stands which contain more or less bluegrass. The horses do exceptionally well on this mixed pasture without grain, and the colts make very satisfactory growth.

Numerous cases were found in which cattle and sheep also are pastured on alfalfa, but usually after the second or third cutting of hay. Cattle and sheep tend to bloat on alfalfa pasture, but the consensus of opinion is that, if the animals are properly handled, this danger is little if any greater than that from pasturing clover. It is considered usually of first importance that both cattle and sheep should be accustomed to alfalfa pasture gradually, by turning them on and off several times before giving access to the pasture continuously, and feeding well on hay each time before they are turned in.

By many it is considered safer, after the animals are once accustomed to the pasture, to leave both cattle and sheep on alfalfa continuously, regardless of rain or dew. If taken off for several hours and left without feed, then turned back on pasture, the animals while hungry are likely to eat large quantities of forage quickly, thus increasing the danger of bloat.

Some feeders consider it highly advisable to allow cattle to have access to cured hay most of the time while on alfalfa pasture, more especially during the early part of the pasture season. In general, the danger of bloat in pasturing alfalfa is much less during late summer than in early spring, and further the danger is still less when pasturing an old stand of alfalfa containing considerable bluegrass. On most farms cattle and sheep are not pastured on alfalfa until after the second cutting of hay, and in many instances not until after the third. Those who have followed these general precautions are finding but little difficulty in pasturing the crop.

EXPERIENCES OF SOME FARMERS.

Following are some of the specific experiences given by farmers who use alfalfa for pasture:

In 1916, pastured 5 acres of alfalfa with 40 ewes and their lambs from May 10 until September 1. It was an old stand. I gave a light feed of hay to prevent bloat and had no trouble whatever. The lambs made an average gain of 60 pounds each while on pasture.—Dan Lesh, Huntington County, Ind.

In 1916, pastured 8 acres of alfalfa with 135 ewes and 13 lambs during July. The ewes were thin but soon got in good condition. I had to accustom them to it gradually. The lambs made a good gain. From August 1 to September 6, I pastured 98 shoats and 130 lambs on this same field of alfalfa with access to corn with rape sown in it at the last cultivation. The results were very satisfactory.—William Jager, Mashka County, Iowa.

In the fall of 1917, I pastured 25 cattle on 15 acres of alfalfa then ready for the third cutting of hay. About two-thirds of the acreage was an old stand and contained considerable bluegrass. I was afraid of bloat, however, and took out insurance, but no losses occurred. The hay was harvested in a very satisfactory manner. The cattle were thin in the beginning, but took on flesh very rapidly.—W. V. Kell, Allen County, Ind.

Pastured 850 sheep on 25 acres of alfalfa from April 1 to May 15, 1916, to delay the first cutting of hay. The plan was a success. Cut the hay a month later than usual. Fed corn at the rate of three-fourths pound daily per animal, and each made a gain of 15 pounds. The sheep topped the Omaha market. The field was cut three times for hay after selling the sheep.—Jacob Weiss, Crawford, Iowa.

PASTURING HOGS.

Alfalfa is one of the most satisfactory and effective hog-pasture crops known to the Corn-Belt region, and is used more often in pasturing hogs than any other class of animals. Unlike sheep and cattle, hogs naturally have no tendency to bloat on alfalfa. Hogs can be turned in on alfalfa at any time and without any preliminary feeding or special management to get them accustomed to it. The only precautions necessary are those which safeguard the stand of alfalfa. The same care must be taken not to pasture too early or too late in the season, and grazing the stand too close to the ground has the same results regardless of the kind of live stock pastured.

Because of its palatability, hogs eat large quantities of alfalfa forage, and if fed at the same time a reasonable amount of corn they make very satisfactory gains. Fair gains, in fact, can be maintained under some conditions on alfalfa pasture alone, but this system of feeding is not advisable as a general practice. Some corn, if only a very light feeding, is essential to the making of economical gains, even on alfalfa pasture. The profits derived from pasturing alfalfa with hogs are usually very satisfactory and often more than can be derived in any other way.

FARM EXPERIENCES WITH ALFALFA HOG PASTURE.

Alfalfa is highly appreciated throughout the Corn Belt by all who have used it to any extent as hog pasture. By judicious use its value is being demonstrated throughout most parts of this region as a factor of great importance in commercial pork production. A few extracts from a number of reports are as follows:

Sowed $2\frac{1}{2}$ acres of alfalfa for hog pasture. During the second year after seeding it pastured 80 shoats all season. During early spring, the growth was rank and the pigs small, and it became necessary to cut the alfalfa once for hay, securing about 1 ton per acre. Used this field in this way for 3 years without injury to the stand. Always cut once for hay, and after that the hogs keep it down fairly well. Always fed shoats some grain and got good gains.—W. A. Taylor, Story County, Iowa.

In 1916, put 14 sows and 114 pigs on 11 acres of alfalfa from April 1 until winter. Cut four times for hay and got 20 tons.—Edward Poiteven, Crawford County, Iowa.

For the past 4 years have used 8 acres of alfalfa for pasture and hay, from May 1 until late fall. Last year had 20 sows and 100 pigs on the 8 acres. Fed the pigs a light ration of corn. The spring pigs averaged 125 pounds by October 1, when turned in to hog down corn. Hogs could not eat all the forage in July and August. Cut the crop twice for hay, and got a total of about 2 tons per acre.—D. D. Hazelton, Carroll County, Iowa.

Last year had 35 sows and 165 pigs on 15 acres of alfalfa from May 1 until November 1. Cut the field 3 times and got 2 tons of hay per acre besides the pasture. Have been pasturing 8 acres in this way for 3 years. Bluegrass is coming in.—Charles G. Cockerill, Greene County, Iowa.

Pastured 12 sows and 120 spring pigs on 5 acres of alfalfa from May 1 until September 10, and cut 10 tons of hay besides. It was the best paying land on the farm.—W. O. Kunkel, Hancock County, Illinois.

Pastured 165 hogs on 25 acres of alfalfa from May 2 until September 15. Cut hay three times and got a total of 60 tons. The hogs do not reduce the yield of hay materially.—Huddleston Farm, Dewitt County, Ill.

We usually set aside 7 acres of alfalfa for hog pasture and use it from May 10 to September 1. Generally it is necessary to cut twice. Get about a ton of hay per acre, all told. The plan is to pasture only to half of its carrying capacity, and to leave some to be cut for hay. Have used the 7 acres in this way for three years without injury. We average about 40 sows and 300 to 350 spring pigs on this pasture. When the number is too great for the pasture, the hogs are turned on another alfalfa field for a short period.—J. M. Ballard, Grant County, Ind.

A number of farmers report pasturing alfalfa after the third cutting of hay. Usually forage is abundant on the average farm up to August 1, but then alfalfa meets a pressing need. The value of alfalfa as a pasture crop during the latter part of the season, when other pasturage is very scarce, can not easily be overestimated. Two of the Iowa reports in this regard are as follows:

Pastured 180 hogs on 10 acres of alfalfa all season. Turned off about 10 days after each cutting. Sometimes turned 8 or 10 milch cows on the field in the fall and let the stock harvest all the last cutting. No trouble from bloat. Am well pleased with the results.—Walter Tomlinson.

For the past four years have pastured $4\frac{1}{2}$ acres of alfalfa with about 50 shoats after the third cutting of hay, usually while hogging corn.—Estes Gates, Newton, Iowa.

RESULTS WITH A POOR STAND OF ALFALFA.

It is often a question what to do with a poor stand of alfalfa, and it is difficult to decide whether to plow it up and reseed or to use it further for pasture. In several instances the bare spots were disked and harrowed and rape seed with some oats was sown broadcast. The following report gives some idea as to the value of an old stand when used as a pasture in this way:

In 1917 sowed 4 acres of old alfalfa stand with a mixture of oats and rape early in the spring. April 28 turned on 28 shoats with the following results:

April 28, 28 shoats averaged 71 pounds each, total 1,988 pounds. June 28, 28 shoats averaged 133.2 pounds each, total 3,730 pounds. Gain in 62 days 62.2 pounds each, total 1,741 pounds.

Altogether the hogs received 24 bushels of corn and 28 bushels of oats. Daily gain was 1 pound. Gilts were thin and in good condition to take on weight. About $1\frac{1}{2}$ pounds of grain feed was consumed per pound of gain.

A good example of continuous pasturing of hogs on alfalfa with grain fed in self-feeders is afforded by feeding demonstrations conducted during the season of 1917 on the Borgelt farm at Havana, Ill.

The hogs were fed principally on corn in connection with the alfalfa pasture with the following results:

July 1, 133 shoats, average weight 70 pounds, total 9,310 pounds. October 1, average weight 210 pounds, total 27,930 pounds; 91 days, average gain 140 pounds, total gain 18,620 pounds.

Average daily gain, 1.5 pounds.

Feeds consumed: Corn, 1,220 bushels; middlings, 1,500 pounds.

Grain per 100 pounds of gain, 375 pounds.

Gain per bushel of corn fed, 15.3 pounds.

The small amount of middlings was used in the beginning of the demonstration, after which the only feed available was the corn in self-feeders and the alfalfa pasture. In addition to the pasture afforded, the 15 acres of alfalfa produced 28 tons of hay. Reducing the results to an acre basis, the feeding of 81.3 bushels of corn and 100 pounds of middlings on an acre of alfalfa made possible a total return of 1,241 pounds of pork and 1.9 tons of hay. The results in this instance are very satisfactory and further illustrate the method of continuous heavy pasturing after the first cutting of hay.

ADVANTAGES AND LIMITATIONS OF ALFALFA GROWING.

There are a number of difficulties in growing alfalfa over a large part of the Corn Belt mainly because of soil and climatic conditions; but there is ample evidence that if grown successfully without too great initial expense the crop becomes a valuable asset on most farms of the region.

The present indications are that alfalfa will not replace the common clovers to any great extent on Corn-Belt farms. Everything considered, it is of greater value when grown on a comparatively limited acreage to supplement the hay and pasture crops of the regular rotations.

On live-stock farms alfalfa is especially valuable in that the increase in hay and pasture makes it possible to add greatly to the number of live stock kept, or, in some instances, additional hay may be sold on the market. On grain farms an acreage of alfalfa makes it possible to plow under a large part or all of the clover in the rotation for soil improvement.

As more rapid and labor-saving methods are adopted in putting up alfalfa hay and in the cultivation of corn, the acreage of alfalfa on Corn-Belt farms may be increased without seriously deranging the labor program. In the Corn Belt proper it is doubtless more important than in any other section of the country to give careful consideration to methods of relieving labor pressure if alfalfa is to be introduced into the cropping system in any considerable acreage.

Experience is proving that alfalfa is the most valuable pasture crop so far grown in the region, especially for hogs. It furnishes an all-summer pasture of the best quality, and indications are that the crop will continue to be used to a much greater extent for pasture purposes.